

KEUFFEL & ESSER CO.

DRAWING MATERIALS

AND
SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. SAN FRANCISCO. ST. LOUIS.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

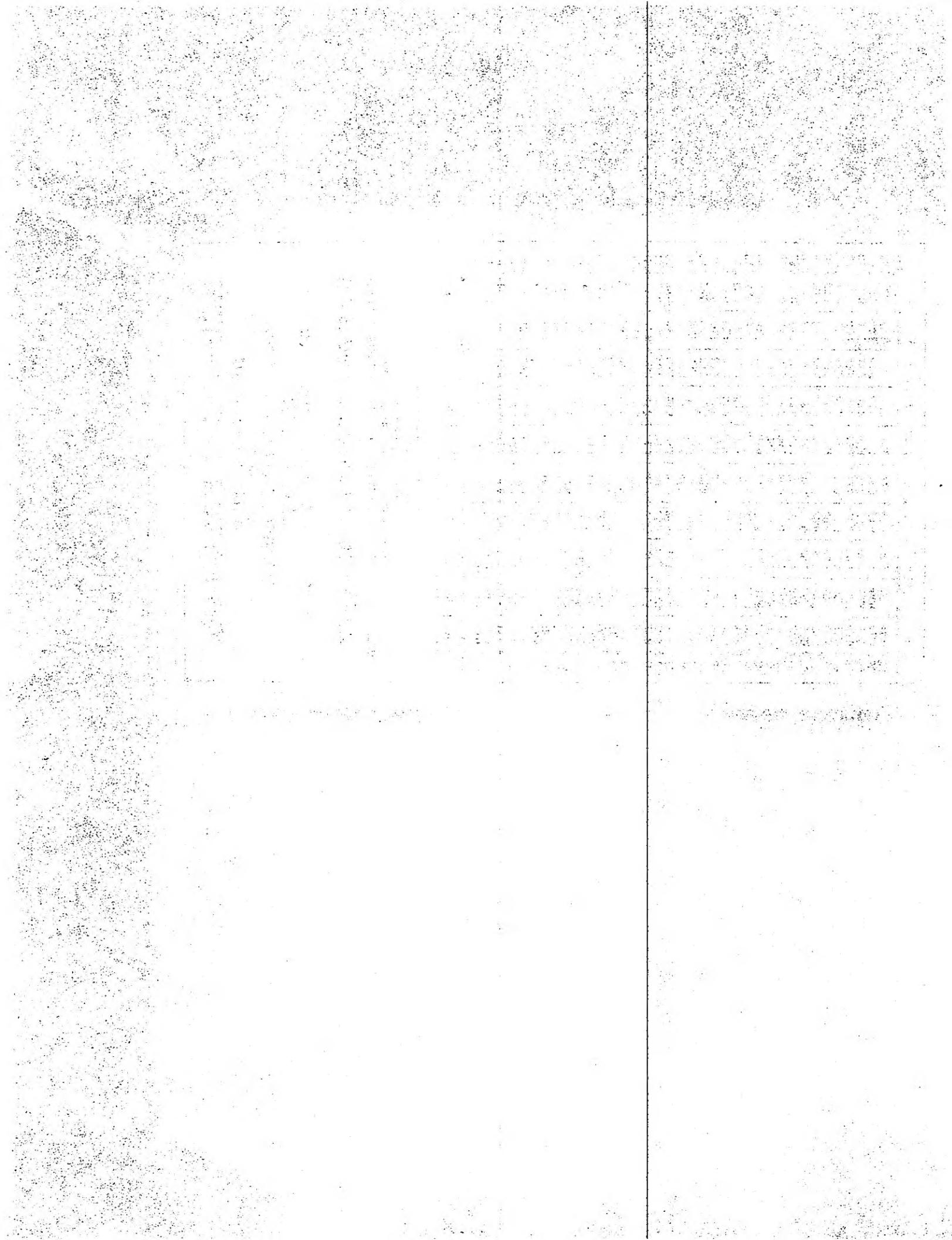
DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.

For Single Track Excavation

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	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9



Elevations of Merchant line plugs						Plan 18 1/4
+5 Sta	+5 Rod	H.I.	-5 Sta	-5 Rod	-SEI.	Tie Tie El.
21-12.20	-190	120.11	6297	-3.95	12406	As charac
5503			6293	-341	123.52	Old Mine plan
			6448	-423	124.34	
			6549	-321	123.32	
			6607	-3.70	123.81	
			Breadst 6697 ft 0 - Pitch at 6614			
			Sucker pipe 6442			
			4" line to end of Pitch.			
			Permanent track laid to 6552			
			Tunnel height 8.05 at 8 AM Jan 1911 91 ft 20 in			

Completion of Williams contract.

Breadst at 6697	Total Advance 975 ft
Pitch " 6614	(83 ft from B)
Percutie " 6552	(45 ft from B)
Sucker pipe " 6442	(255 ft from B)
4" Airline " 6617	(80 ft from B)
Last st of Bottom 6" pitch	

Beginning of Merchant tunnel co contract

Breadst at 6697	
Pitch at 6614	
Sucker pipe at 6602	
Percutie at 6607	

Feb 4, 1912
Tunnel hair h = 119 3pm } measured by
Feb 5 1912 noon } friendly

1 = 126

	Elevations		Feb. 11, 1914		
	+ S. Rd	H.I.	- S. Rd	- S.E.I.	The Elevation
123.52	+ S. Rd	H.I.	- S. Rd	- S.E.I.	Altitude in m.
629.3	- 2.30	121.22	654.9	- 2.13	123.35
					116.57
					7.31
					116.52
					7.31
					116.70
					7.76
					8.26
Breast st. 679.0					
Ditch at 668.7					
Ties at 666.0					
Tunnel rail 6 x 127 at 1 PM (same)					
Elevations Feb. 14, 1914					
123.52	- 2.14	121.38	654.9	- 1.97	123.35
629.3					116.87
					6.72
					7.32
					7.35
660.7					116.52
- 2.46					
123.84					
668.2					116.70
					7.76
- 3.08					7.94 (Temp. 14)
124.46					
676.1					8.31
- 3.83					
125.21					
Breast st. 681.5					
Ditch 670.7					
Ties 668.0					
Elevations Feb. 21, 1914					
123.35					
654.9	- 2.22	121.13	668.2	- 3.34	116.70
					7.77
					7.94
676.1					
- 4.07					
125.20					
116.70					
2.30					
Ties highest point 679.1 (higher than rail end, plus 6.70)					
Breast 687.4					
Ditch 678.5					
Ties 669.5					
Subsidiary 669.0					

Tunnel level	Distance from Break	End contraction on 1 side only - incomplete
Heir Tom out by H.H. Stoeck on Feb 20 1914 and one side reared, giving end contraction on one side only.	2.53 ft	Length of Heir Tom - 2.53 ft
George on Feb 21 at 1 P.M. - $b = 114$ corrected $b = 117$		To measure b , take gauge readings by
Measurement on Feb 27 at 9 A.M. by Stoeck	$Q = 1200 \text{ sec. ft.}$	Distance between bracing poles and
b (corrected) = $116 - Q = 11.85 \text{ sec. ft.}$		Subtract 0.02' for tree head
Q taken from Rating Curve drawn by the State of UP & G.C.		
March 2, 1914 - Monthly estimate for Feb.		
Breast at 671	Advance 274 ft.	
Dist. broken to 6830	Advance 216 ft.	
Brummett track 6790	" 183 ft.	
Stoeck pipe at 6760	" 158 ft.	
<u>Geology</u>		
At 6719. Quartzite appears with normal dip of $\pm 25^\circ$ to the N.W. and continues for 25 ft. corresponding to a bed approximately 30 ft thick. Narrow beds of limestone appear in the quartzite. From 6795 to Breast formation is similar to that shown there by Williams contrasting to - hard limestone of good breaking quality. Stands well and requires no timber.		
Numerous fissures and open water courses strike across the tunnel and dip $70-80^\circ$ S.E. These fissures carried water under heavy pressure when first struck but during the month they have dried up above the ditch level. There are still percolating water from below. The breast is dry.		
Tunnel min 3/21/14 - 4/26/14. $1 = 1.12$ $Q = 11.85 \text{ sec. ft.}$		

End contraction on 1 side only - incomplete
 Length of Heir Tom - 2.53 ft
 To measure b , take gauge readings by
 Distance between bracing poles and
 Subtract 0.02' for tree head

Distance from Break 141 ft
 181 ft The under 6761 = 280 ft
 211 ft

March 26, 1914						
- Elevations -						
+5. STA	+5. Rod	H.I.	-5. STA	-5. Rod	-5. ELEV.	True To El
124.85						
69.54	-169	123.16	70.77	-2.25	125.41	117.69
			71.64	-2.36	125.52	117.91
			71.57	-1.84	125.00	117.89

Breast at 7183 at 11 AM

Ditch at 7087

Ties at 7000

Sucker pipe at 6982

Tunnel weir at 1:30 P.M. (knowing)

$$h = 1.09 \quad Q = 1072 \text{ sec/ft.}$$

April 2, 1914

Breast at 7269 at 4 PM. Advance 292 ft.

Ditch broken to 7155 - Mucked to 7100 - 114 ft from Br.

Ties to 7092 - 117 ft from Br.

Sucker Pipe at 7087 - 122 ft from Br.

Tunnel weir at 5 PM.

$$h = 1.04$$

$$Q = 9.94$$

Elevations Water Creek Creek Ditches

Distances

$$7.72 \text{ rail} = 7.20$$

$$7.61 \text{ turnsheet} = 7.14$$

7.11 Screen eye in cap - not 100% 1520 unless plug 7164 is knocked out

$$\text{Grade light under } 7164 = 2.61 - 41 = 2.20$$

$$\text{Grade light under } 7157 = 2.61 - 41 = 1.70$$

Breast is in fine grained limestone similar to that out last month.

Breast is dripping water but there are no heavy flows. At a

point 100 ft from Breast a 2" pipe could carry a line of flow.

At a 0 7150 large fault fissure strikes N50E dip 65° S.

Breccia soft lime and required timbering for 124. It is dry and will not cause trouble.

At 0 7065 open water course strike N30E Vert. H. is now dry above ditch level.

Similar one at 7080, somewhat smaller, 112 ft. 20 ft. above water from SW. side. Dry above track level.

At 0 7100 water course (dry) strike N70E Dip 65° N.

April 30, 1914.

Elevations

+5570
12541
7077

+5 Rod	H.I.	-5 Star	-5 Rod	-5 Elbow
-2.16	123.28	7164	-228	125.56
		7255	-182	125.10

Breast at 7275.5

April 16, 1914

Elevations

125.56
7164

-2.35	123.21	7255	-1.88	125.09
	73.12		-2.91 *	126.12
	73.82		-2.27	125.58

Elevations water

Greek Games and Sports

True Tie E1

Dist. above the Normans

Grade lights under 7164
under 7255

232

695: Permanent tie ~~686~~ G.K.
Screw eye in cap for grade
7.84 Temporary roll 686

713 | Temporary rail 7.07

7382 1.84

73/2 156 95 25

* N.B. Probably wrong. Prod read by S.E. Taylor 291
Should probably be 191. To be tested with grade lights
and not used unless it checks with one of those figures - 291, 141,
(156 or 256).

Breast at 7400

April 12 7269

Adranc 131 A.

Dated at 7282 - 118A from Breast

Ties on 1255 1255 from R

V. piper or 2/25 17.5 ft from a

Tunnel wind - corrected $\Delta x = 0.05$ $H = 1.93$ ft

pencil mark to brass plate $h = 1.00 \text{ ft}$
Stoner says latter is correct since it is the datum used to construct his rating curve. From it $\Phi = 9.30 \text{ sec ft}$

April 28, 1914. Elevations					
+5 Sta	+5 Pool	14.1	-5 Sta	-5 Pool	-5 Elev.
125.56 7164	-2.70	122.86	738.2	-2.65	125.51
			746.3	-2.60	125.46

Turnsheet 20 ft from Breast. +4.15 118.71

Breast at 7536 Adv. 267

Ditch at 7422 - 114 ft from Bl.

Tunnel. Weir h = 1.015 Q = 9.55 scf/s.

Lavigne Creek gage = 0.644. Posts in water back to 0 ft.

Snake Creek weir full of rocks.

May 2, 1914.

Breast at 7581 at 9 AM.

April 2 = 7269

Advance - 312 ft.

Ditch 108 ft from Breast = 7473

Ties at 7428 - 153 ft from Breast.

Drinker pipe at 7335

Tunnel. weir 11 AM.

h = 1.010 Q = 9.50

125.56
7164

Elevations

-190	123.66	738.2	-1.83	125.49	118.45
		746.3 (new) 746.3 (old)	1.79	125.45	118.66
		756.3	2.14	125.80	118.91

Elevations water Creek Creek Ditches

True Tie El	Distributaries
118.45	7.06
118.66	6.80
118.84	

At 7230 to 7315 large fissure crosses tunnel S.E. ± N 25° W with variable dip. At 7290 intersects open mouth of a small fissure. From 7290 to 7320 timbered.

Small watercourse at 7340 - 2 sets of timber.

Beds dip variably to N.E. At 7332 dip 3.5°

Small vertical watercourse at 7405. Bedding horizontal at 104.5.

At 7550 vertical watercourse crosses tunnel. Lining 100 mil. min.

Bedding flat from 7430 to 7550. 7550 to Dr. irregular.

Hand line with bunch of chart.

7.04 Tie = 685

6.79 Temp. rail = 6.9

6.89 Temp. rail = 6.8

Grade lights given under 7462 = 154.
7563 = 1.64

Elevations Water Drake's Creek Creek Ditches

Elevations							
+5 Sta	+5 Rod	H.I.	-5 Sta	-5 Rod	-SE Key	True E.L.	Dist. below
125.49							
738.2	1.71	123.78	746.3	1.69	125.47	118.66	681
			756.00 ^(new)	2.04	125.82	118.91	6.91
			76.50	2.80	126.58	119.12	7.46

Breach at 7669.

Tunnel weir at 245 P.M. $h=1.04$

May 13, 1914

Breach at 7702 at 7:30 P.M. (Dry)

Sample 5 ft from Breach on contact Grey & Black Limestone
Black Limestone impregnated with pyrite. Ore occurs in
Knife blade fissures parallel to the tunnel and in specks in
the grey limestone.

Assay - Pb. 9.9%

Cr. 0.2%

Ag 3.40%

Av - Trace

Zn 3.3%

Fe 3.1%

SiO₂ 65.42%

May 19, 1914 8 A.M.

Tunnel weir $h=1.06$

May 18, 1914

Tunnel weir $h=1.01$ (measured by Freckly.)

May 22, 1914					
Elevations					
+5 Sta. El=125.47 7463	+5 Rod. H.I. -1.06	-5 Sta. 7563 7650 (high) 7680 7780	-5 Rod -1.42 -2.24 -2.23 -2.60	-5 El. 125.83 126.65 126.64 127.01	Temporary El. 118.91 119.12 119.20 119.45
Breast at 7809		- Adv 228			
Ditch at 7719					
Ties & sucker pipe at 7650					
Tunnel. weir May 21	6.91	h = 1.03			
	May 22	11 AM.	h = 1.02		
Larena weir	h=0.9 09 (uncorrected)	11			
May 27, 1914					
Tunnel. weir	h = 1.00	(measured by Friendly)			
June 2, 1914					
Elevations					
21.125.33 7563	21.13 7780	240	127.25	119.45	
	7919	278	127.43	119.80	
Breast at 7951	Adv 370				
Ditch at 7870					
Ties at 7830					
V Pipe at 7790					

Elevations	Water	Creek	Grade	Ditches
7.52				
7.53	Permanent tie = 7.20			
7.44	Temporary rail = 7.11			
7.56	7.11 " 7.40			
Grade light B = 2.56 - 30 = 2.26	7780			
2.44 - 30 = 2.14	7780			
2.53 - 30 = 2.23	7780			
7.60	Perm tie = 7.30			
7.63	Temp rail = 7.25			
Grade light B = 2.60 + 20 = 2.90	(7780)			
2.63 - 20 = 2.43	7919			
Grade tie under 719 = 7' 5 1/4				
(given to Hancock)				

Elevations Water ~~on water~~ Greek Green Ditches

		June 10, 1914					
Tunnel	weir	-10.30 A.M.	$h = 0.99$	$Q = 9.20$			
		-Elevations-					
+5 Sta	+5 Rod	HT.	-5 Sta	-5 Rod	-5 Elev.	True Tie E.	
EI=125.83							
7563	-1.06	124.77	7780	-2.30	127.07	119.45	1.62
			7919 ^{new} plugs	-2.83	127.60	119.80	1.10
			8037	-2.88	127.65	120.04	1.26
Breast. at 80.52	Advance 101. in 8 days						
Ditch at 7960							
✓ Pipe & Ties at 7920							
		June 20 1914					
		-Elevations-					
EI=125.83							
7563	-0.99	124.84	7919	-2.75	127.67	119.80	1.57
			8040 ^{new}	-2.85	127.69	120.10	3.08
			8171	-3.67	128.51	120.43	1.10
Breast at 8186	Advance 235 in 18 days						
Ditch at 8185							
Ties at 8040							
✓ Pipe at 7990							
8000 ft of brass plug cemented into E wall							
2 ft above ties marked 8000. Plugs 8040 & 8171 measured from 8000 ft plug with 500 ft Lufkin tape.							
Tunnel weir $h = 0.97$ 1 P.M.							

July 1, 1914

Elevations:

7919	-232	125.37	80.40	-242	127.69	120.10
		81.71	326	128.53		120.43
		82.92	290	128.17		120.73

Estimate for June.

Measured on July 1st Estimated for July 2nd.

Breadth at 8307 July 1st.

Advance to July 2 - 13.

Breadth at 8329 July 2nd.

7951 June 2

Advance 36.9 ft

Breadth at 8223

Ties at 8191 } July 2-1914.

V pipe at 8163

1" line at 818 (approx)

Breadth in blocky gray limestone medium bed.

At 40 8225 to 60 8240 - a series of terraces.

Formation at this 0 is broken up.

7.59 Tie 3.60

8.10 Tie under 8171 = 8.11 OK.

7.44 7.44 on transect.

Water Creek Creek

Summ. Min readings.

by Taylor

Date	hr	h	0	min	day
July 1	9 Am	1.01	9.50	1.04	9.95
2	10. "	1.00	9.30		
3	9. "	1.02	9.65		
4	10. "	1.01	9.50		
5	12. "	1.03	9.30		
6	8. "	1.01	9.30		
7	9. "	1.02	9.30		
	7	16585	766.30		
		9.41	9.47		

New measurements gauges are being put in for tunnel and Lake Creek. No reading was taken on Lake Creek or Lavaona Creek during the month will start taking readings in about 3 days
(signed Taylor)

Elevations Aug 14, 14,

128.95					
1436	186	127.09	86.58	-189	128.98
					121.65

8791	-2.13	129.12	121.98
------	-------	--------	--------

7.33 Permanent tie = 7.30 ft.

7.24 Temporary rail = 7.35

40-8797 (6ft. N.W. of Hwy) three strikes across tunnel, about due E & W and dips 37.5° N. Line is filled 1/8 thick of blue lims with black specks which makes it look like porphyry. It has weathered completely on outside.

	Elevations				
128.16					
8292	-1.80	126.36	8658	-2.63	128.99
			8791	-2.88	129.24

Bread at 8920

Ditch 8820

Tie 8791

Sept 21 1914.

Brass plug marked 9000 placed 2 $\frac{1}{2}$ ft above rail in north east wall at a 0 9000 ft from portal.

Measured from 8000 ft plug with 300 ft left in top.

Bread at 9086 11.0.07.

Aug 21 8667

41.9 ft Advance

Ditch at 9025

Bread 81 ft from Bread

Seis at 8961

" 125 " "

V Pipe at 8911

" 175 " "

	Elevations				
128.99					
8658	-1.92	127.07	8791	219	129.26
			8894	255	129.62

Tunnel width 6 = 0.48

Elevations Water ~~Shallow~~ Water Creek Creek Measurements Ditches

127.65	7.34	
121.98	7.26	Tie = 7.20
122.24	7.37	Top of Rail = 7.74

Geology - At 8791 bed highly tilted to north and lime is magnified. Timbed from 8915 to 8925 a slight movement of beddings makes ground slough at this point. It is not heavy.

At 8970 there has been considerable movement 11 to beddings which are 3.75

From this point the breast ground gradually becomes harder and denser. Breast is highly metamorphosed and extremely hard and dense. In places there are small bodies of igneous intrusions. Contact metamorphic minerals present (as sampled) very little distinction between rock as yet.

No water struck this month. Breast dry and dusty.

From tie = 7.44

Top = 7.7